

INTISARI

Salah satu teknologi untuk mengatasi masalah kualitas benih rendah dan cekaman kekeringan adalah *halopriming* menggunakan kalium nitrat (KNO₃). Penelitian ini bertujuan untuk: 1). Menentukan konsentrasi dan durasi optimum *halopriming* KNO₃ untuk meningkatkan kualitas benih deteriorasi maupun normal, 2). Mengevaluasi respon tanaman tomat varietas Servo F1 hasil *halopriming* KNO₃ pada berbagai tingkat cekaman kekeringan. Penelitian dilaksanakan dalam dua tahap. Tahap I dilaksanakan pada September–November 2024 menggunakan Rancangan Acak Kelompok Lengkap (RAKL) faktorial 2×4×4 dengan dua blok sebagai ulangan. Faktor perlakuan terdiri atas: kondisi benih (normal dan deteriorasi), konsentrasi KNO₃ (0%, 1,5%, 3,0%, dan 4,5%), dan durasi perendaman KNO₃ (0, 12, 24, dan 36 jam). Tahap II dilaksanakan pada April–Juni 2025 menggunakan RAKL faktorial 2×4 dengan tiga blok sebagai ulangan. Faktor perlakuan adalah: konsentrasi KNO₃ (0% dan 4%) dan interval penyiraman (2, 4, 6, dan 8 hari sekali). Hasil penelitian tahap I menunjukkan bahwa benih normal memiliki kualitas benih lebih tinggi dibandingkan benih deteriorasi. Konsentrasi *halopriming* KNO₃ dan durasi perendaman optimum untuk benih normal adalah 3,56% dan 23,43 jam menghasilkan bobot kering total sebesar 0,185 g (2,78% lebih tinggi dari kontrol tanpa perlakuan *halopriming* KNO₃). Pada benih deteriorasi, konsentrasi *halopriming* KNO₃ dan durasi perendaman optimum adalah 2,16% dan 27,29 jam menghasilkan bobot kering total sebesar 0,168 g (250,00% dari kontrol tanpa *halopriming* KNO₃). Penelitian tahap II menunjukkan bahwa sebagian besar variabel tidak memperlihatkan interaksi antara *halopriming* KNO₃ dan interval penyiraman, kecuali panjang akar total 5 mst, kandungan prolin, dan laju fotosintesis. Aplikasi KNO₃ sebesar 4% meningkatkan bobot buah per tanaman sebesar 9,74% dibandingkan tanpa KNO₃. Interval penyiraman 2 hari sekali memberikan hasil terbaik dengan bobot buah per tanaman sebesar 564,24 g, sedangkan interval 4, 6, dan 8 hari sekali menurunkan hasil masing-masing sebesar 44,62%, 65,38%, dan 84,25%. Dengan demikian, *halopriming* KNO₃ terbukti mampu memperbaiki kualitas benih normal maupun deteriorasi serta meningkatkan produktivitas tomat.

Kata kunci: benih, cekaman kekeringan, *halopriming*, kalium nitrat, tomat

ABSTRACT

One technology to overcome the problem of low seed quality and drought stress is halopriming using potassium nitrate (KNO₃). This study aimed to: 1) Determine the optimum concentration and duration of KNO₃ halopriming for improving the quality of deteriorated and non-deteriorated seeds, and 2) Evaluating the response of tomato plants of the Servo F1 variety resulting from halopriming with KNO₃ to various levels of drought stress. The study was conducted in two stages. The first stage was conducted in September–November 2024 used a Randomized Complete Block Design (RCBD) factorial 2×4×4 with two blocks as replication. The experimental factors were: seed condition (non-deteriorated and deteriorated seeds), KNO₃ concentration (0%, 1.5%, 3.0%, and 4.5%), and soaking duration (0, 12, 24, and 36 hours). The second stage was conducted in April–June 2025 used a RCBD factorial 2×4 with three blocks as replication. The experimental factors were: KNO₃ concentration (0% and 4%) and watering interval (once every 2, 4, 6, and 8 days). The results of the first stage of the study showed that non-deteriorated seeds had higher seed quality than deteriorated seeds. The optimum concentration of KNO₃ halopriming and soaking duration for non-deteriorated seeds were 3.56% and 23.43 h, resulting in a total dry weight of 0.185 g (2.78% higher than the control without KNO₃ halopriming treatment). In deterioration seeds, the optimum concentration of KNO₃ halopriming and soaking duration were 2.16% and 27.29 h, resulting in a total dry weight of 0.168 g (250.00% of the control without KNO₃ halopriming). The second stage showed that most variables did not show an interaction between KNO₃ halopriming and watering interval, except for root length in 5 wap, proline content, and photosynthesis rate. Application of 4% KNO₃ increased fruit weight per plant by 9.74% compared to without KNO₃. A watering interval of every two days produced the fruit weight per plant of 564.24 g, while intervals of 4, 6, and 8 days reduced yields by 44.62%, 65.38%, and 84.25%, respectively. Thus, KNO₃ halopriming has been shown to improve the quality of both non-deteriorated and deteriorated seeds, as well as increase tomato yield.

Keywords: drought stress, halopriming, potassium nitrate, seeds, tomato